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TECHNICAL SERVICES OFFICE

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OF APP / extra copy

January 5, 2000

Ms. Audrey Cole  
Regional Administrator  
Division of Environmental Quality  
224 South Arthur  
Pocatello, Idaho 83204


**RE: Title V Permit Application; Revisions to Section 7 Excess Emissions Procedures  
(Additional Information)**

Dear Ms. Cole,

The enclosed pages were inadvertently omitted from the submission to your office from Agrium CPO dated December 30, 1999. These pages should be inserted into the previous submission at the end of the section entitled, Area 2 - East Sulfuric Acid Plant. Two (2) additional copies are again included for your convenience in forwarding to the Boise office.

If you have any questions, please call me at the number listed above.

Sincerely,

  
Monty Johnson  
Environmental Manager

Enc.

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## NORMAL OPERATION OF EAST SULFURIC PLANT

Shane T. Passey  
12/29/99

Following are:

- A. Operating limits.
- B. Consequences of deviation.
- C. Steps required to correct or avoid deviation.

NOTE: The following limitations were compiled as per current operating standards.

1. #1 98% acid dilution flow - 43.5 gpm (Limit)
  - A. Consequence of deviation - Acid strength to high or too low.
  - B. Correction - Adjust dilution water flow valve.  
Note: Located on control panel
2. #2 98% acid dilution flow - 4.0 gpm (Limit)
  - A. Consequence of deviation - Acid strength too high or too low.
  - B. Correction - Adjust dilution water flow valve.  
Note: Located on control panel
3. 93% acid dilution flow - 14.0 gpm (Limit)
  - A. Consequence of deviation - Acid strength too high or too low
  - B. Correction - Adjust dilution water flow valve.  
Note: Located on control panel.
4. Sulfur feed - 44.0 gpm or 655.5 lb. per hour (Limit)
  - A. Consequence of deviation - Loss of production or excessive emissions.
  - B. Correction - increase sulfur flow or decrease sulfur flow. (According to ambient conditions and blower speeds)  
Note: Located on control panel and is automatic controller (raise or lower set point as needed)
5. 93% acid temp to storage - as cool as possible or below 100\* (Limit)
  - A. Consequence of deviation - accelerated deterioration of piping and/or storage tanks.
  - B. Correction - Open or close 93% recycle block valve (manual) as needed to cycle cooler acid into product tank. Check 93% acid cooler automatic bypass to make certain it is closed 100%  
Note: Located on top of 93% product tank and just east of 93% acid pump (red wheel valve).  
Automatic bypass controller located on control panel.
6. 93% product flow to storage - 135 - 155 gpm (Limit)
  - A. Consequences of deviation - Product tank and /or #1 98% acid tank level increase, possible overflow, possible personnel injury.
  - B. Correction - check recycle manual block valve for proper setting (closing valve slightly will likely increase acid transfer), open automatic transfer valve if needed, check 93% transfer pump for proper out put, check drying tower pump for proper output.  
Note: 93% recycle manual block valve located on top of 93% acid tank and just east of 93% transfer pump (red wheel valve). 93% automatic controller located on control panel and marked as such.
7. #1 waste heat boiler water level, eye hye indication - +1.5" of normal (Limit)
  - A. Consequences of deviation - over heating of boiler internals, fire tube rupture, loss of steam production through possible down time.
  - B. Correction - add water to boiler, opening automatic boiler feed valve. If automatic do not respond. Open automatic bypass manual block valve a few turns and monitor level.  
Note: Automatic controller located on control panel and marked as such. Automatic bypass manual block valve is located in big steam auto control valve building, east end south side.
8. #2 waste heat boiler water level, eye hye indication - +1.5 - +3.0 of normal (Limit)
  - A. Consequences of deviation - Refer to #7A
  - B. Correction - Refer to #7B  
Note: Automatic controller located in big steam auto control valve building, east end, north side.
9. #1 Waste heat boiler steam production flow - 130,000 lb. per hour (Limit)
  - A. Consequences of deviation - Loss of production in steam driven equipment.
  - B. Correction - Keep sulfur flows at max. prescribed rates.

Note: Flow indication located on control panel and marked as such.

10. #2 waste heat boiler steam production flow - 34,000 lb. per hour (Limit)

A. Consequences of deviation - Refer to #9A.

B. Correction - Refer to #9B

Note: Flow indication located on control panel and marked as such.

11. Sulfur burner temp - 1900\* maximum (Limit)

A. Consequences of deviation - Excessive emissions, increased or decrease of converter bed temps, increased or loss of steam production, deterioration of boiler refractory or loss of steam production, possible internal boiler damage.

B. Correction - Increase or decrease main blower speed as needed (4200 rpm max.), increase or decrease sulfur flow as needed.

Note: Main blower speed control governor located on blower deck, east end of blower, rotate clockwise to increase, counter clockwise to decrease. Sulfur flow controller located on control panel and marked as such. Rotate clockwise to increase, counter clockwise to decrease flow.

C. Watch SO<sub>2</sub> monitor and keep under prescribed limits (3.6 PPM per hour)

Note: Located on control panel, east end chart.

12. Gas temp exiting #1 waste heat boiler - 675 - 680\* (Limit)

A. Consequences of deviation - Refer to 11A.

B. Correction - Refer to 11B and 11Ba.

13. Gas temp exiting #2 waste heat boiler - 735\* (Limit)

A. Consequences of deviation - Refer to 11A.

B. Correction - Refer to 11B and 11Ba.

14. Catalyst converter bed temps

	Inlet	Outlet
#1	804*	1112* (1120* Max)
#2	801*	980* (Limit)
#3A	850*	895* (Limit)
#3B	840*	890* (Limit)
Econo	890*	456* (Limit)

A. Consequences of deviation - loss of conversion if temps are allowed too low, possible excessive emissions, Crystallizing of catalyst grids if temp allowed too high (1125\*).

B. Correction - Open BV#2 to heat inlet of #1 bed, outlet will follow. If too hot close BV#2 to cool inlet and outlet will follow.

Note: BV#2 is located east end of sulfur burner, south chain.

A. Consequences of deviation - Conversion loss if temps too low, certain amount of steam production loss

B. Correction - Open BV#5 to heat if inlet temp is too low, outlet will follow. Close to cool if temps too high, outlet will follow.

Note: BV#5 is located east of #2 waste heat boiler in bypass duct.

A. Consequence of deviation - loss of conversion, decreased pre-heating of boiler feed water in economizer.

B. Correction - Open BV# 6 to heat gas stream through hot pass vessel (bypassing cooler gas)

Note: Controller located on control panel.

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B. Correction - Open BV# 6 to heat gas stream through hot pass vessel (bypassing cooler gas)

Note: Controller located on control panel.

A. Consequences of deviation - Decreased pre-heating of boiler feed water, cooler gas to #1 absorbing tower.

B. Correction - Open BV# 6 to heat gas stream in hot pass vessel which in turn will heat inlet and outlets of 3A and 3 B beds which in turn puts more heat to the inlet and outlet of economizer. (bypassing cooler gas around hot pass)

Note: Controller located on control panel.

- #4 - 800\*                      838\* (Limit)
- A. Consequences of deviation - Excessive emissions, excessive or loss of heat to cold pass vessel, loss of heat in #2 absorbing tower.
  - B. Corrections - Close BV# 6 to heat. Open to cool  
Note: Controller located on control panel.
15. #1 98% absorbing tower acid temperature - 180\* (Limit)
- A. Consequences of deviation - possible stacking, inadequate absorbing in towers.
  - B. Correction - Adjust drying tower bypass automatic open to heat, closed to cool.  
Note: Controller located on control panel.
16. #2 98% absorbing tower acid temperature - 180\* (Limit)
- A. Consequences of deviation - Refer to 15A.
  - B. Correction - Adjust Final acid tower automatic bypass open to heat, close to cool.  
Note: Controller located on control panel.
17. Drying tower acid temperature - 160\* (Limit)
- A. Consequences of deviation - above 160\*, inadequate cooling of acid in #1 98% acid tank, higher acid temp at inlet of #1 98% acid cooler, high outlet acid temp of #1 98% acid cooler.
  - B. Correction - Increase drying tower acid flow(open north chain valve on pipe rack south of cooler deck),close final acid tower auto bypass(located on control panel), close inter pass bypass auto valve (located on control panel), increase cooling water tower fan speed (speed selector located on top of cooling tower deck, east of either fan nozzle), reverse cooling tower fans to de-ice cooling tower fill (cold weather) (directional selector located on top of cooling tower deck, east of either fan), increase cooling water flow (2 pumps).
18. Main blower discharge pressure - 155" (limit) depending on blower speed and fan vanes being free of dirt or ice build up.
- A. Consequences of deviation - (lower discharge press) Excessive heat in sulfur burner, waste heat boilers, catalyst converters etc.
  - B. Correction - Check blower speed (tachometer located on east end of blower deck), de-ice blower fan vanes, remove dirt from fan vanes (insert walnut shells through blower inlet duct hand hole)
19. #1 waste heat boiler discharge steam pressure - 260# (Limit)
- A. Consequences of deviation - Loss of production in steam driven equipment and heating needs
  - B. Correction - Set 250/125# steam letdown automatic controller to prescribed set point, adjust demand automatic as needed to allow letdown free range travel.  
Note: Controller located on control panel and marked as such.
20. #2 waste heat boiler discharge steam pressure - 260# (Limit)
- A. Consequences of deviation - Refer to #19A.
  - B. Correction - Refer to #19B.
21. 250# steam press - (Steam pressure read out gauge for #19 and #20)
- A. Consequences of deviation - Refer to #19A
  - B. Correction - Refer to #19B
22. 125# Steam pressure gauge - 120# minimum - (Limit)
- A. Consequences of deviation - loss of vacuum capabilities in phos evaporators, loss of ammonia temperature and pressure in DAP.
  - B. Correction - Set automatic letdown controller to proper set point (125#), adjust automatic demand (in manual mode) to allow letdown free range travel.
23. 25# steam pressure gauge - 30# (Limit)
- A. Consequences of deviation - Back pressure in main blower cause reduction of speed, burner temp increase, catalyst converter bed temp increase.
  - B. Correction - If all up stream automatic letdowns and demands are set as prescribed, call North plant and request the operator to vent the excess steam press. over 30#
24. 5# Steam pressure gauge - 6.2# (Limit)
- A. Consequences of deviation - Decreased pre-heating and deareation of water in D.A. tank.
  - B. Correction - Set automatic controller to desired set point.
25. Boiler feed water discharge press gauge - 360# (limit)

- A. Consequences of deviation - Inadequate boiler feed water supply to #1 and #2 waste heat boiler.
  - B. Correction - Make sure boiler feed pump is running or switch to the other pump.  
Note: Switch gear located east side of each boiler pump.
  - 26. Water press. to feed D.A. tank 50 - 70# (Limit)
    - A. Consequences of deviation - lack of adequate water supply to D.A. tank.
    - B. Correction - Adjust automatic controller to prescribed set point.  
Note: Controller located on control panel and marked as such.
  - 27. B-5 boiler steam pressure gauge - 240#  
Note: Controlled by North plant operator.
  - 28. #1 98% absorbing tower flow - 3300 gpm (limit)
    - A. Consequences of deviation - Inadequate absorption of internal gasses, possible excessive emissions.
    - B. Correction - Adjust chain operated manual block valve for proper flow.  
Note: Chain valve located on extreme south pipe rack, south valve.
- Tail gas temperatures
- 29. Entering #1 absorbing tower - 456\* (limit)
    - A. Consequences of deviation - decreased ability to heat absorbing tower acid, inadequate absorption capabilities.
    - B. Correction - increase economizer discharge temp, refer to #14 section #3A and #3B.
  - 30. Entering 2000 hp. Booster blower - 168\* (limit)
    - A. Consequences of deviation - decreased cooling capabilities if cold pass
    - B. Correction - refer to #29B
  - 31. Entering cold pass heat exchanger - 224\* (Limit)
    - A. Consequences of deviation - increased or decrease of beds 3A, 3B and/or 4<sup>th</sup>, increase and/or decrease of acid temp of #2 absorbing tower acid.
    - B. Correction - N/A
  - 32. Exiting cold pass heat exchanger - 661\* (Limit)
    - A. Consequences of deviation - Increase and/or decrease heating/or cooling capabilities of hot pass heat exchanger, and 4<sup>th</sup> bed.
    - B. Correction - Open BV# 6 to bypass hot pass heat exchanger or close to direct gas stream through hot pass heat exchanger.  
Note: BV# 6 damper controller located on control panel and marked as such.
  - 33. Entering #2 absorbing tower - 396\* (Limit)
    - A. Consequences of deviation - Increase or decrease ability to heat or cool #2 absorbing tower acid, possible decrease in tower absorption capabilities, possible excessive emissions.
    - B. Correction - Refer to 32B
  - 34. Exiting #2 absorbing tower - 175\* (Limit)
    - A. Consequences of deviation - N/A
    - B. Correction - N/A
  - 35. 2000 hp. Booster blower Discharge pressure - 68" current rate and ambient conditions (limit)
    - A. Consequences of deviation - N/A
    - B. Correction - N/A
  - 36. 2000 hp booster blower mechanical oil pressure - 28# (limit)
    - A. Consequences of deviation - Inadequate oil supply to blower bearings
    - B. Correction - increase mechanical oil pump out put.  
Note: Increase oil press by turning adjustment knob located on mechanical oil pump, south end of booster blower.
  - 37. 2000 hp booster blower inlet pressure - +1.0 - +2.0 (limit)
    - A. Consequences of deviation - System internal gas stream flow, loss of absorption capabilities in #1 absorbing tower, possible excessive emissions.
    - B. Correction - Close booster blower louvers to obtain prescribed setting.  
Note Open louvers to increase gas stream flow, which will lower inlet press. Close to slow gas stream, which will increase inlet press and aid in absorption capabilities and help keep emissions

under control.

38. 2000 hp booster blower amp meter read out - 420 (limit)
  - A. Consequences of deviation - possible damage to booster blower motor, booster blower shutting down, excessive emissions, excessive heat of catalyst converter, excessive heat of sulfur burner, added stress to main blower.
  - B. Correction - Close back some on the booster blower louvers to decrease motor amp load.  
Note : Controller located on control panel.
39. Steam pressure to sulfur feed lines - 40 - 60# (limit)
  - A. Consequences of deviation - Internal "freeze up" of sulfur, production loss.
  - B. Correction - Adjust automatic controller to prescribed setting, or adjust manual bypass as needed.  
Note: Both located west of east plant control room just east of sulfur rail car dumping pit.
40. Raw water pressure 80\* min 120\* (limit)
  - A. Consequence of deviation - Below minimum, inadequate water supply to water regeneration units, above maximum, possible rupture of raw water supply lines.
  - B. Correction - Call supervisor to adjust wells for proper flow pressures.
41. O2 Monitor readings 5.0 (limit)
  - A. Consequences of deviation - possible excessive emissions
  - B. Correction - Adjust sulfur flow to burner according to recommendations, blower speed, bed temps for proper temp ranges.
42. North cooling tower fan amp read out - 140 amps (limit)
  - A. consequences of deviation - Fan motor damage, shut down of fan, increased heat of cooling water, increased acid temps.
  - B. Correction - N/A
43. South cooling tower fan amp read out - 150 amps (limit)
  - A. Consequences of deviation - Refer to 42A
  - B. Correction - N/A
44. "A" cooling tower pump amp read out - 160 amps (limit)
  - A. Consequences of deviation - Damage to pump motor, shut down of pump, increased heat of acid due to loss of cooling water circulation.
  - B. Correction - N/A
45. "B" cooling tower pump amp meter read out - 160 amps (limit)
  - A. Consequences of deviation - Refer to #44A
  - B. Correction - Refer to #44B
46. "C" cooling tower pump amp meter read out - 175 amps (limit)
  - A. Consequences of deviation - Refer to #44A
  - B. Correction - Refer to #44B
47. 2000 hp booster blower fan bearing temperature read outs
  - A. North bearing - 140 - 160\* (Limit)
    - a. Consequences of deviation - overheating of fan bearings, possible damage to bearings and fan shaft, down time, loss of production.
    - b. Correction - Add cooling water to oil cooler as needed.  
Note: Adjust water flow valve to oil cooler, located at north east corner of oil reservoir.
  - B. South bearing - 140 - 160\* (Limit)
    - a. Consequences of deviation - Refer to 47a.
    - b. Correction - Refer to 47b.
48. 2000 hp booster blower motor bearing temperature read out.
  - A. South bearing - 140 - 160\*
    - a. Consequences of deviation - Refer to 47a.
    - b. Correction - Refer to 47b.

## DUTIES

A Operator, steps; 1B, 2B, 3B, 4B, 5B, 6B, 7B, 8B, 9B, 10B, 11B, 11C, 12B, 13B, 14 - #1B, 14 #2B, 14 #3AB, 14 #3BB, 14 econo B, 14 #4B, 15B, 16B, 17B, 18B, 19B, 20B, 21B, 22B, 23B, 24B, 25B, 26B, 27 (North plant A operator), 28B, 29B, 30B, 31B, 32B, 33B, 34B, 35B, 36B, 37B, 38B, 39B, 40B, 41B, 42B, 43B, 44B, 45B, 46B, 47B, 48B

B Operator, steps; N/A during normal operation.